

NOTES AND DESCRIPTIONS CONCERNING BRAZILIAN STONEFLIES

(PLECOPTERA)

(With 2 plates)

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The stoneflies of South America are very imperfectly known. Some 60 species have been recorded from Brazil, but few of the original descriptions are adequate for identifications. In another paper (Jewett, 1959) I have recorded 15 species of stoneflies from the vicinity of Nova Teutonia in the state of Santa Catarina. The present study includes 20 species of which five were recorded from Santa Catarina. Notes are included on a number of types which I was able to study through the cooperation of authorities in European museums.

The majority of specimens upon which this paper is based were very kindly loaned by Dr. JOSÉ CANDIDO M. CARVALHO of the Museu Nacional, do Brasil (NM). Dr. MONT A. CAZIER of the American Museum of Natural History (AMNH) sent a few specimens for study. Dr. M. BEIER of the Naturhistorisches Museum, Vienna (NMV) loaned the types of several of Klapálek's species for critical study. The type of *Perla klugii* Pictet was sent for examination by Dr. H. SCHIEMENZ, Zoologisches Museum, Berlin (ZMB). Dr. Walter Hackman unsuccessfully searched for two of Klapálek's specimens which were supposedly deposited in the Zoological Museum, Helsinki. Mr. D.E. KIMMINS, British Museum (Natural History) kindly sent to me some notes and drawings of one of the cotypes of *Kempnyia tenebrosa* Klapálek.

To all of these men I am most grateful. Special acknowledgement is made to Dr. JOACHIM ILLIES, Hydrobiologische Anstalt, Plön, Germany, for invaluable assistance in comparing material with some of the types of the late R.P.L. NAVAS S.J. and for other help.

Family Gripopterygidae

Genus *Gripopteryx* Pictet

1841. *Gripopteryx* Pictet, Hist. nat. gén. et part. des insectes Névroptères. Fam. de Berlidae, p. 327.
1909. *Paragripopteryx* Enderlein, Zool. Anz. 34:392, 416.
New synonymy.
1921. *Gripoptera* Samal, Soc. Ent. Belgique Ann. 61:110.
1959. *Gripopteryx*, Jewett, Amer. Midland Naturalist 61(1):149. Placed *Gripoptera* Samal in synonymy.

Careful study has been made of Brazilian material of this genus belonging to five species, two species, two of which have not previously been described. There are at least two other described species in the country.

Wing pigmentation and, to some extent, venation are of value in placing species in this genus. Wing characters are distinctly different for each of the five species represented in the material which I have studied from Brazil. ENDERLEIN

(1909) and Klapálek (1904) attributed much taxonomic importance to the number of crossveins in the costal space beyond the subcosta, the former basing his genus *Paragripopteryx* on the presence of one such crossvein. As shown in the table below, this character varies and is unreliable as a specific or even as a generic character when taken alone. There is also much variation in the number of crossveins in the hind wing.

Gripopteryx cancellata (Pictet)

1841. *Capnia* (*Gripopteryx*) *cancellata* Pictet, Hist. nat. gén. et part. des insectes Névroptères. Fam. de Perlidae :328, pl. 41.
 1852. *Capnia cancellata*, Walker, Cat. spec. neur. insects in coll. Brit. Mus., Pt. I (Phryganides-Perlides) :175.
 1861. *Capnia cancellata*, Hagen, Synop. Neuroptera N.A., Smith. Instit. :303.
 1913. *Gripopteryx cancellata*, Banks, Am. Ent. Soc. Trans. 39:204.

Table 1. Number of Crossveins in Costal Space beyond the Subcosta in Forewings of Brazilian *Gripopteryx*

	Male		Female	
	left	right	left	right
<i>reticulata</i> (6 specimens)	2 2	2 3	2 3	2 4
	4	4	4	4
<i>maculosa</i> (7 specimens)	0 (2) 1 3	0 (2) 2 1	0 (2) 1	0 (2) 0
<i>cancellata</i> (8 specimens)	0 (4) 2	0 (4) 3 0 (7)	0 (2) 1 0 (8)	0 (2) 0 0 (8)
<i>tessellata</i> (16 specimens)	0 (7) 0	1	0	1
<i>crassila</i> (2 specimens)	0	1	0	0

Brazilian material studied displays little difference in the relative length of the tarsal segments, the first two segments together being about half as long as the hind segment. The number of cercal segments does not differ significantly. Genitalia, particularly those of the male, offer good specific characters.

1921. *Gripopteryx cancellata*, Samal, České Spolec. Ent. Casopis 18:67.
 1921. *Gripoptera brasiliensis* Samal, Soc. Ent. Belgique Ann. 61:110, figs. 2-5; female. *New synonymy*.
 1959. *Gripopteryx brasiliensis*, Jewett, Amer. Midland Naturalist 61(1):149; male; designation of male allotype.

A Key to Nine Brazilian Species of *Gripopteryx*

1. Forewing with dark pigment encircling crossveins; much of membrane hyaline 2
 Forewing without dark pigment encircling crossveins; membrane lightly to heavily infuscated throughout 7

2 (1).	Size small, forewing length less than 10 mm	3
	Size large, forewing length more than 10 mm	5
3 (2).	Hind wing with numerous crossveins	4
	Hind wing with few, if any, crossveins	<i>gracilis</i>
4 (3).	Underside of each femur with a small tooth	<i>tessellata</i>
	Underside of each femur without a tooth	<i>garbei</i>
5 (3).	Forewing length at least 15 mm. in male, 18 mm in female; subanal lobes of male markedly hooked near tip, fig. 3B	<i>reticulata</i>
	Forewing length at most 13 mm. in male, 15 mm. in female; subanal lobes of male (<i>maculosa</i>) not hooked near tip, fig. 2B	6
6 (5).	Subanal lobes of male not hooked near tip; female subgenital plate extending over most of 9th sternite, scarcely bilobed, without heavily sclerotized distal border	<i>maculosa</i>
	Male not known; subgenital plate of female extending slightly, bilobed, with heavily sclerotized distal border	<i>pardina</i>
7 (1).	Size large, forewing length of male at least 9 mm., of female, 15 mm	
		<i>cancellata</i>
	Size small, forewing length of male 8 mm., of female (<i>crassila</i>), 11 mm	8
8 (7).	Wings slender, elongate	<i>klapaleki</i>
	Wings not slender, not elongate, fig. 1	<i>crassila</i>

Study of the original description and of material at hand convinces me that *Gripoptera brasiliensis* Samal is conspecific with *Capnia (Gripopteryx) cancellata* Pictet.

The type of this species was deposited in the Berlin Museum, but Dr. Schiemenz who kindly searched for the type was unable to find it. The male which I designated as the allotype of *Gripoptera brasiliensis* is deposited in the California Academy of Sciences and bears the following data: SANTA CATARINA. Nova Teutonia, I-56, Fritz Plaumann.

Collection Data. — DISTRITO FEDERAL. Bom Retiro, 8-I-57, Santos, Machado, Barros, Myriam, 2 males (MN, SGJ). SANTA CATARINA. Nova Teutonia, Fritz Plaumann, 2 males, 3 females, as recorded previously. No data, male (MN).

Gripopteryx crassila, n. sp.

Figs. 1, 1A, 1B

1959. *Gripopteryx* sp. Jewett, Amer. Midland Naturalist 61(1):150; brief description.

Length of forewing: holotype male, 8 mm, allotype female, 11 mm.

General color brown throughout with uniformly infuscated wings. Head through compound eyes greater in width than greatest width of prothorax; uniformly brown. Ocelli form equilateral triangle. Antennae composed of about 30 segments, third segment of about same diameter but twice as long as fourth segment, antennal length about equal to that of forewing in female, somewhat shorter in male. Prothorax nearly rectangular with rounded corners, wider posteriorly than anteriorly. Cerci composed of about 20 segments, equal at most to one quarter length of forewing. Wings less slender than in other described species of Brazilian *Gripopteryx*.

Male. — First nine abdominal tergites without special modification but sclerotized along anterior margins; 10th tergite enlarged and drawn backward to median, heavily sclerotized, quite small tip which is turned downward and is shallowly furcate. First eight abdominal sternites unmodified; ninth sternite enlarged, convex, evenly rounded on posterior margin; 10th sternite modified, pair of large subanal

lobes that curve evenly upward extend from median, posterior area. Median, up-turned, hooked process suspended from inner face of 10th tergite.

Female. — Subgenital plate of allotype extending only slightly beyond margin of eighth sternite, broadly and shallowly emarginate.

This species is readily distinguished from other members of the genus described from Brazil by its small size, infuscated wings, and by the rounded shape of the wings. Spotting is entirely absent from the types.

Collection Data. — SANTA CATARINA. *Holotype* male, Nova Teutonia, X-56, Fritz Plaumann. *Allotype* female, Nova Teutonia, XI-56, Fritz Plaumann. Both deposited in the collection of the California Academy of Sciences.

Gripopteryx garbei Navás

1936. *Gripopteryx garbei* Navás, *Revista do Museu Paulista*, 20:731-732.

Dr. ILLIES has studied the female type of this species and has informed me that it is very similar to *G. tessellata* Brauer in venation and shape of the subgenital plate but that it lacks teeth on the femora.

Collection Data. — None.

Gripopteryx gracilis (Burmeister)

1839. *Sembris gracilis* Burmeister, *Handbuch der Entomologie*, Berlin :876.
1841. *Capnia* (*Gripopteryx*) *gracilis*, Pictet, *Hist. nat. gén. et part. des insectes Névroptères. Fam. de Perlidae* :330, pl. 42, figs. 1-3.
1852. *Capnia gracilis*, Walker, *Cat. spec. neur. insects in coll. Brit. Mus., Pt. I (Phryganides-Perlides)* :175.
1861. *Capnia gracilis*, Hagen, *Synop. Neuroptera N.A.*, Smith. Instit. :303.
1904. *Griptoteryx gracilis*, Klapálek, *Ergeb. Hamburg. Magal. Samm.* :10.

The original description of the type of this species states that the body length is two lines, mentions the spotted wings, and notes that the cerci contain 12 segments. It seems probably that the cerci were broken. PICTET (1841:331) stated that the hind wing was not reticulate, but BURMEISTER (1839:876) did not mention this in his original description. In his key KLAPÁLEK (1904:8) indicates that the hind wing has few crossveins.

Unfortunately, the type of this species cannot be located with certainty. Dr. SCHIEMENZ sent for my examination a specimen from the Berlin collection labelled *gracilis*. An additional label questions that this specimen is Burmeister's type. Regretably, this specimen is in very poor condition with the abdomen and both hind wings missing. It is possible that this is the specimen examined by KLAPÁLEK and mentioned by him. Since it is possible that the type of *gracilis* may yet be found and that it has few, if any, crossveins in the hind wings. I am not at this time placing *tessellata* Brauer (1868) as a synonym of *gracilis* Burmeister (1839). However, the two names may refer to the same species.

Collection Data. — None.

Gripopteryx klapaleki (Enderlein)

1904. *Gripopteryx cancellata*, Klapálek, *Ergeb. Hamburg. Magal. Samm.* 75:8; description and figures of wings and male genitalia. (Not *cancellata* Pictet, 1841).
1909. *Paragripopteryx klapaleki* Enderlein, *Zool. Anz.* 34:392, 416. Type species of *Paragripopteryx*.

The type of this species could not be located by Dr. HACKMAN at the Zoological Museum at Helsingfors where it was apparently located at one time (Klapálek, 1904:8). The description given by Klapálek, and particularly his figures, suggests

that this name may be a synonym of *tessellata* Brauer. However, KLAPÁLEK described the wings as being brown, not brown-spotted. Therefore *klapaleki* may be a good species.

Collection Data. — None.

Gripopteryx maculosa, n. sp.

Figs. 2, 2A, 2B, 2C

Length of forewing: 12-13 mm. in male, 14-15 mm. in female.

General color brown throughout with slightly infuscated forewing marked extensively with rounded spots, only rarely spotted on hind wings and then only in distal costal area. Head through compound eyes slightly greater in width than greatest width of prothorax; uniformly brown. Ocelli form equilateral triangle. Antennae composed of about 30 segments, third segment of about equal diameter but over twice as long as fourth segment, antennal length nearly as long as forewing. Prothorax wider rearward, corners rounded but structure generally rectangular in shape. Cerci composed of about 10 segments.

Male. — First nine abdominal tergites without special modification, slightly sclerotized along anterior margins, heaviest on 9th tergite; 10th tergite sclerotized, drawn backward to form broad triangle, apex or tip of which is thickened laterally and drawn slightly downward but not forming sharp hook. First eight abdominal sternites unmodified, 9th sternite enlarged, rounded posteriorly; 10th sternite modified, pair of long subanal lobes extending from distal median area. Median, upturned, hooked process is suspended from inner face of 10th tergite.

Female. — In general, similar to male but somewhat larger. Seventh sternite of abdomen sclerotized medially, extending slightly rearward; 8th sternite bearing sclerotized subgenital plate that is about

2/3 as wide as sternite, extending rearward about length of 8th sternite, rounded distally and slightly emarginate medially.

This species is similar to *G. reticulata* Brauer but is smaller, the wings do not have so many crossveins, and details of the genitalia of both sexes differ. The male genitalia are very distinctive and readily characterize the species.

Collection Data. — *Holotype* male, Alto Mosella, Le Vallon, Petropolis, ESTADO DO RIO, 3-57, Dalcy (NM). *Allotype* female, Reserva do Museu, Santa Tereza, ESPÍRITO SANTO, 13-XI-53, Santos, Machado, Barros (NM). *Paratypes.* Same data as for holotype, 2 males (NM, SGJ); same data as for allotype, male, female (SGJ).

Gripopteryx pardina Navás

1936. *Gripopteryx pardina* Navás, *Revista do Museu Paulista* 20:730-731.

Dr. ILLIES has studied the female type of this species and compared material of the previous species with it. It differs in having an unforked R_s (contrary to Navás' figure) the membrane of the hind wing is dark brown, not hyaline, and the distal margin of the subgenital plate is sclerotized. Its relationship to *G. maculosa* will not be clearly understood until more material, including the unknown male, is collected and studied.

Collection Data. — None.

Gripopteryx reticulata Brauer

Figs. 3, 3A, 3B, 3C

1868. *Gripopteryx reticulata* Brauer, *Zool. Thiel* 2, 1 Abt., A, no. 4:51.

The previously undescribed female of this species may be characterized as follows:

Length of forewing: 18-20 mm.

Generally similar to male but somewhat larger. Subgenital plate broadly rounded, shallowly emarginate medially, extending slightly beyond margin of 8th sternite. Subgenital plate cleared in KOH sclerotized broad band along either side, its shape variable.

Material listed below was compared with the male type which is deposited in the Vienna Museum. Most specimens of this species are easily identified because of the extensive reticulation of both wings and the heavy spotting. It is the largest Brazilian species studied. The bent tips of the male subanal lobes are characteristic of this species.

Collection Data. — *Allotype* female, Bom Retiro, DISTRITO FEDERAL, 8-I-57, Santos, Machado, Barros, Myriam (NM). Same data, 2 males (NM, SGJ). ESTADO DO RIO. Itatiaia, XI-50, Travassos and Dalcy, male, female, 1 without abdomen (without abdomen, NM; male, female, SGJ). SÃO PAULO. Morro Boa Vista, Serra da Bocaina, 2,100 m., V-51, Dalcy and Machado, female (NM).

Gripopteryx tessellata Brauer

Fig. 4

1868. *Gripopteryx tessellata* Brauer, Zool. Thiel, 2, 1 Abt., A, no. 4:51; female.
 1916. *Gripopteryx neofriburgensis* Navás, Brotéria, Sér. Zool. 14:27; description and figures of wing and male genitalia. New synonymy.
 1959. *Gripopteryx neofriburgensis*, Jewett, Amer. Midland Naturalist 61(1):149-150; description and figure of female genitalia; designation of female allotype.

This species is readily identified by a combination of size, the venation and color pattern of the wings, and the distinctive teeth on the femora. The type in the Vienna Museum was kindly loaned to me for study, and it matches closely in all essential details, including the tooth

or spur on each femur, the material listed below. The type of *G. neofriburgensis* Navás has not been located, but the figures accompanying Navás' description convince me that his species should be placed in the synonymy of *G. tessellata* Brauer.

The shape of the dorsal furcate process on the tenth tergite varies considerably, but the general pattern is very specific.

Collection Data. — DISTRITO FEDERAL. Bom Retiro, 8-I-57, Santos, Machado, Barros, Myriam, 2 males (NM, SGJ). ESTADO DO RIO. Alto Mosella, Le Vallon, Petropolis, Dalcy Albuquerque, 1-II/8-III/57, male, female (NM). SANTA CATARINA. Nova Teutonia, Fritz Plaumann, 5 males, 8 females, as previously recorded.

Family Perlidae

Subfamily Acroneurinae

Apparently all the described species of tropical American Perlidae belong to the subfamily Acroneurinae. Of the many genera which have been described from South America few are well understood. Many of these are based on single female specimens. Several of the unique types have disappeared, among which are some that were destroyed during the last world war.

Of Brazilian species with only two ocelli, all of those which I have examined, except the type of *Onychoplax* Klapálek (1914), seem to belong to the genus *Anacroneuria* Klapálek (1909). The female subgenital plate of the type of *Onychoplax* is quite different from those of the species which I assign to *Anacroneuria*. The type is in good condition and was examined through the kindness of Dr. BEIER.

I cannot separate generically the type of *Macrogynoplax aterrima* Klapálek

(1916) from species placed in *Anacroneuria*, but since the male has not been described I am not transferring this species to *Anacroneuria*. Until the male of the type of the genus, *M. guayanensis* Enderlein (1909), is described, the status of *Macrogynoplax* will be in doubt. The type of *M. aterrima*, which I have examined, is in good condition and is deposited in the Vienna Museum.

Among Brazilian material which I have studied during the preparation of this paper are eight species which have three ocelli, sclerotized processes in the aedeagal structure of the male, a large swollen female subgenital plate with a small median notch, and modification of the median area of the male ninth sternite. I presently assign these to three genera.

Six of these species I place in *Kempnyia* Klapálek (1914) because the wing venation and the subgenital plates of the female resemble closely those of *K. tenebrosa* Klapálek, the type species of the genus. In this genus color pattern and the aedeagal process of the male offer very good specific characters. There is considerable variation in the wing venation within a species. The shape of the female subgenital plate is generally similar.

Another species belongs to *Eutactophlebia* Klapálek (1914) which is closely allied to *Kempnyia*, a principal difference being the numerous crossveins in the forewing.

The remaining species, while showing affinity with the others, differs quite strikingly in the wing venation, especially in the anal area of the hind wing, and also seems to have significantly different details in the male genitalia. Since none of the existing generic descriptions fits this species, a new generic name is proposed for it.

Genus *Anacroneuria* Klapálek

1909. *Anacroneuria* Klapálek, Wiener ent. Ztg. 28:228.
 1924. *Forquilla* Navás, Broteria, Ser. Zool. 21:74.
 1958. *Anacroneuria*, Jewett, Amer. Midland Naturalist 60 (1):159. Placed *Forquilla* Navás into synonymy.

The relationship of this genus to other described South American genera with two ocelli is not clear since the descriptions of several genera are based largely on the venation of single female specimens. It is my opinion that some of the names, particularly those applied to material from northern South America, will ultimately be placed into synonymy.

Anacroneuria furfurosa, n. sp.

Figs. 9, 9A

Length of forewing, 12 mm in male, 13-14 mm in female.

Head light brown without distinct pattern; M-line not discernible; darkest color in ocellar area but ocelli not in well defined dark area; rear corners of head lightest. Pronotum brown with median yellow stripe occupying fifth to nearly third of pronotal width. Legs yellow and brown, colors not sharply delineated; femur mostly yellow on outer face except for distal brown area; tibia mostly brown on outer face, darkest near junction with femora. Antennae brown, segments on at least distal half bicolored in most specimens. Cercal segments yellow to light brown on about basal third, bicolored beyond. Wings tinted brown, veins brown with subcostal vein darker than others.

Female. — Subgenital plate four-lobed, median notch somewhat deeper than lateral notches. Ninth sternite with well marked T, arms of which bear long, coarse hairs.

Male. — With typical, small conical nail on ninth sternite; smaller and darker than female.

The head and pronotal color pattern and the shape of the subgenital plate distinguish this species.

Collection Data. — *Holotype* female, *allotype* male, and three *paratype* females and one *paratype* male, Bom Retiro, DISTRITO FEDERAL, 8-1-57, Santos, Machado, Barros, Myriam (*Holotype*, *allotype*, *paratype* female, NM; male, 2 females, SGJ).

Anacroneuria fuscicosta (Enderlein)

1909. *Neoperla costalis* var. *fuscicosta* Enderlein, Ges. f. Naturf. Freunde Stizber. 3:178.

1959. *Anacroneuria fuscicosta*, Jewett, Amer. Midland Naturalist 61(1):155.

There is considerable variation in material which I assign to this species, and ultimately it may be shown that more than one species is involved. The specimens listed below have head patterns very similar to figure 8A in my 1959 paper noted above. The pronota are quite dark, the median stripe always brownish, and segments of the tails are bicolored.

Collection Data. — ESTADO DO RIO. Itatiaia, XI-50, Travassos & Dalcy, male (NM). ESPIRITO SANTO. Ribeiro do Engano, C.I.O. Cruz, X-44, 2 females (NM); same, except Vale do Itauna, 10-IX-42, Travassos and Santos, male, 5 females (2 females, NM; male, 3 females, SGJ); Reserva do Museu, Santa Tereza, 13-IX-55, Santos, Machado, Barros, male, 3 females (female, NM; male, 2 females, SGJ). 282, male (NM). C. 336, 2 males (NM).

Anacroneuria subcostalis Klapálek

1921. *Anacroneuria subcostalis* Klapálek, Ann. Soc. Ent. Belgique 61:326.

Several specimens are associated with this name on the basis of similarity in

color pattern, particularly that of the wings. The head and appendages are yellow. The forewing has a very dark brown subcostal vein, darkened crossveins in the area of the anastomosis and dark pigment in an irregular band near the apical margin of the wing, thus creating a large clear area in the apical portion of the wings. The hind wings have yellow veins throughout, only the subcostal vein slightly darker than the others. The lateral brown stripes on the pronotum are bordered on the outside by a yellow band; the median yellow pronotal stripe occupies about a third of the pronotal width. The female subgenital plate is four-lobed and similar in shape to that of *A. crenulata* Jewett (1958) described from Mexico and Central America. The male has the usual conical nail on the ninth sternite and is smaller than the female.

Collection Data. — AMAZONAS. Tiquie, VI-49, J.C.M. Carvalho, female (NM); Rio Itacai, V-50, J.C.M. Carvalho, female (NM). DISTRITO FEDERAL. Bom Retiro, 8-1-57, Santos, Machado, Barros, Myriam, 2 males, female (male, NM; male, female, SGJ).

Enderleina, n. gen.

This genus, based on the species described below, is characterized by having three ocelli, male genitalia with the ninth sternite modified to form a keel-like structure with a small, bare, knob-like structure or hammer near its posterior border, and particularly by the venation of the hind wing which is characterized by a much-reduced anal area.

Judging from the structure of the male genitalia this genus is closely related to *Kempnyia* Klapálek (1909) and *Eutactophlebia* Enderlein (1909). It differs from both principally in the venation of the hind wing.

Type of genus: *Enderleina preclara* Jewett.

Enderleina preclara, n. sp.
Figs. 9, 9A

Length to wing tips, 16 mm in holotype male. Length of forewing, 13 mm in holotype male.

General color of holotype male dark brown with infuscated wings and bright orange prothorax. Head uniformly dark brown above, lighter below, with brown antennae. Ocelli in equilateral triangle, diameter of anterior ocellus less than half that of hind ocelli. Prothorax orange, nearly as wide anteriorly as greatest width of head, much wider than long, with rounded angles, more oval than rectangular in shape. Mesothorax, metathorax, and abdominal segments dark brown above, lighter below. Legs, feet, cerci brown. Wings rather darkly infuscated.

Ninth sternite bearing large, median, elongated keel, near rear margin of which is small, oval, shiny white knob or hammer. Tenth tergite raised medially near border and bearing patches of stout setae on either side. Subanal lobes modified into stout, blunt-tipped hooks. Aedeagus bearing heavily-sclerotized process.

Collection Data. — *Holotype* male, Mt. Roraima, AMAZONAS, alt. 6,900 ft., Rondon, XII-5-27 (AMNH). The holotype is an alcoholic specimen with the abdomen removed and cleared.

Eutactophlebia gracilenta (Enderlein)
Figs. 6, 6A, 6B

1909. *Acroneuria gracilenta* Enderlein, Zool. Anz. 34:397.
1916. *Eutactophlebia gracilenta*, Klapálek, České Spolec. Ent. Casopis 13:47.

The male and female specimens listed below agree in essentials with Enderlein's description.

Eutactophlebia reticulata Klapálek (1916) described as a larger species may eventually be placed in the synonymy of *E. gracilenta* Enderlein. Additional material of the genus from Espirito Santo is needed to decide if more than one species exists in that state. The types of *E. reticulata* Klapálek, originally in the Berlin Museum, were apparently destroyed during the second world war as they cannot now be located.

Collection Data. — DISTRITO FEDERAL. Bom Retiro, 8-I-57, Santos, Machado, Barros, Myriam, female (NM). ESTADO DO RIO. Independência, Petrópolis, X-29, Mario Rosa, male (SGJ).

Genus *Kempnyia* Klapálek

1914. *Kempnyia* Klapálek, České Spolec. Ent. Casopis 11:60, 68.
1916. *Kempnyia* Klapálek, České Spolec. Ent. Casopis 13:47, 67; *K. tenebrosa* Klapálek, designated as type species of genus.
1932. *Nedanta* Navás, Rev. Chilena Hist. Nat. 36:85; *N. fusca* Navás, designated as type species of genus. *New synonymy.*

Key to Six Brazilian Species of *Kempnyia*

1. Large, robust species with forewing length of 24 mm (male type); body and appendages uniformly brown, wings heavily infuscated *brasiliensis*
Smaller, less robust species with at most a forewing length of 20 mm; color of body, appendages, and wings variable 2
- 2 (1). Wings distinctly smoky brown, head and body mostly brown 3
Wings lightly infuscated or distinctly yellow; head and body yellow or ochraceous 4
- 3 (2). Large species, forewing length of male more than 16 mm, of female, 23 mm *klugii*

- Small species, forewing length of male less than 15 mm, of female, 17 mm, fig. 8 *varipes*
- 4 (2). Body and wings entirely yellow; male aedeagal process as in Fig. 7 *flava*
Body and wings not wholly yellow; male aedeagal process not as above 5
- 5 (4). Forewing length (female) 14 mm; male undescribed *sordida*
Forewing length (male) 16 mm.; male aedeagal process similar to that of *flava*;
female undescribed *obtusa*

It has been my good fortune to examine several of Klapálek's types of this genus as well as to study additional material from the Museu Nacional do Brasil. The following key includes six Brazilian species examined, at least five of which are valid species. Some notes concerning these species follow the key. It seems likely that additional species will be found in Brazil as well as in nearby countries. I have seen four large species from Chile.

Kempnyia brasiliensis (Pictet)

1841. *Perla brasiliensis* Pictet, Hist. nat. gén. et part. des insectes Névroptères. Fam. de Perlidae :216; figs. of adult male.
1852. *Perla brasiliensis*, Walker, Cat. spec. neur. insects in coll. Brit. Mus., Pt. I (Phryganides-Perlides) :151.
1861. *Perla brasiliensis*, Hagen, Synop. Neuroptera N.A., Smith. Instit. :302.
1905. *Perla brasiliensis*, Jacobson & Bianchi, Prjamokr., :617.
1916. *Kempnyia brasiliensis*, Klapálek, České Spolec. Ent. Casopis 13:69.

The type of this species, in the Vienna Museum, was borrowed and studied. It is a male in good condition, not a female as Pictet thought. This is a large, robust species, brownish in color with rather heavily infuscated wings. The tip of the abdomen of the type is somewhat broken, but much of the genitalia is intact. The left subanal lobe is rather long and finger-like in shape.

This species is quite unlike any of the other described Brazilian species of *Kempnyia*. It bears some likeness to large species found in southern Chile.

Collection Data. — Holotype male, assumed to have come from Brazil (NMV).

Kempnyia flava Klapálek
Figs. 7, 7A, 7B

1916. *Kempnyia flava* Klapálek, České Spolec. Ent. Casopis 13:53, 72.

Material of both sexes of this species has been compared with the cotype from the Vienna Museum. The female cotype is pinned and in good condition. The uniform, bright yellow color of the wings and head and the distinctive aedeagal structure of the male are typical for this species.

KLAPÁLEK described this species from two female specimens, one deposited at the Berlin Museum and one at the Vienna Museum. Apparently the specimen at Berlin was lost during World War II. Therefore, I am designating the cotype at the Vienna Museum as the female *lectotype*, and the male specimen in the Museu Nacional do Brasil as the *allotype*.

Collection Data. — ESTADO DO RIO. *Allotype* male, Petropolis, Le Vallon, Alt. Mosella, II/1-III/8/57, Albuquerque (NM). Additional material: Same data as *allotype*, 2 females (NM, SGJ); Itatiaia, XI-50, Travassos & Dalcy, female (SGJ).

Kempnyia klugii (Pictet)

1841. *Perla klugii* Pictet, Hist. nat. gén. et part. des insectes Névroptères. Fam. de Perlidae :267; figs. of entire adult.
1852. *Perla klugii*, Walker, Cat. spec. neur. insects in coll. Brit. Mus., Pt. I (Phryganides-Perlides) :162.

1861. *Perla klugii*, Hagen, Synop. Neuroptera N.A., Smith. Instit., :303.
 1909. *Neoperla klugii*, Enderlein, Zool. Anz. 34:406.
 1916. *Kempnyia klugii*, Klapálek, České Spolec. Ent. Casopis 13:49, 69.
 1916. *Kempnyia tenebrosa* Klapálek, ibid., :69. *New synonymy*.
 1932. *Nedanta fusca* Navás, Rev. Chilena Hist. Nat. 36:86-88; figs. of male and female genitalia. *New synonymy*.
 1932. *Nedanta fulvata* Navás, ibid., 36:88.
 1936. *Perla taunayi* Navás, Revista do Museu Paulista 20:726; female. *New synonymy*.
 1958. *Kempnyia fusca*, Jewett, Amer. Midland Nat. 61(1):150-151; figs. of wings and aedeagal process; placed in *Kempnyia* and relegated *N. fulvata* Navás to synonymy.

Through the kindness of Dr. H. SCHIEMENZ I was permitted to examine the pinned type of *Perla klugii* Pictet. The tip of the abdomen was softened sufficiently to observe the shape of the aedeagal process, and it matches those of males which I previously identified as *Nedanta fusca* Navás. The forewings and subgenital plates of specimens which I have examined match very closely drawings prepared by Mr. E.M. KIMMINS, British Museum (Natural History), and kindly sent to me, of a cotype of *K. tenebrosa* Klapálek. Further, a female specimen from the Vienna Museum loaned to me and labelled as the type also matches in size, color pattern of head and wings, and shape of subgenital plate females from Santa Catarina which undoubtedly belong with males positively identified as *K. klugii*. Dr. ILLIES kindly compared material of *K. klugii* with the type of *Perla taunayi* Navás and found them conspecific.

It should be emphasized that the color pattern of this species has been found to vary on the head and pronotum. These may be entirely suffused with dark brown pigment, and the usually bicolored legs may be wholly brown. The aedeagus of

the male offers the most positive identification of this species.

Collection Data. — Holotype male from Brazil (ZMB).

Five males, 4 females, previously recorded from SANTA CATARINA.

Kempnyia obtusa Klapálek

1916. *Kempnyia obtusa* Klapálek, České Spolec. Ent. Casopis 13:51, 70.

The male specimen listed below matches closely in size and color pattern the pinned type which is in good condition at the Vienna Museum. The body is brownish yellow with brown markings on the head, the most conspicuous of which is a narrow brown band connecting the two ocelli. The wings are tinted yellow. The aedeagal structure is very similar to that of *K. flava*. The aedeagal structure of the male type has not been examined, but if it is similar, there is doubt that *K. obtusa* is specifically distinct from *K. flava*. Additional material may show that the color differences noted between these two named forms represent only gradation within a single species.

Collection Data. — Holotype male, presumably from Brazil (NMV). ESTADO DO RIO. Itatiaia, Mont-Serrat, XII-05, Carlos Moreira, male (NM).

Kempnyia sordida Klapálek

1916. *Kempnyia sordida* Klapálek, České Spolec. Ent. Casopis 13:52, 72.

The unique female type of this species, a pinned specimen in good condition, has been examined, and it is believed that it represents a distinct species. The specimen appears to have been preserved originally in fluid, but this is not definitely known. It has a darker, more somber appearance than *K. flava* and lacks the

clear yellow color in the wings of that species. The pronotum has a narrow brown median stripe, and there are irregular, small, dark areas before and lateral to the anterior ocellus.

Collection Data. — Holotype female, presumably from Brazil (NMV).

Kempnyia varipes Klapálek

Figs. 8, 8A, 8B, 8C

1916. *Kempnyia varipes* Klapálek, České Spolec. Ent. Casopis 13:52, 71.

1932. *Nedanta isoscelia* Navás, Rev. Chilena Hist. Nat. 36:88; fig. of female subgenital plate. *New synonymy.*

A female specimen from the Museu Nacional do Brasil is almost exactly like the pinned type of this species which I have examined. On the basis of size and color pattern three males are associated with this female.

The arrangement of the ocelli varies to some degree among species of this genus, but at least one of the series listed below has the spacing in a definite isosceles triangle. In other respects these specimens closely match the description of *Nedanta isoscelia* Navás. Therefore, I am relegating Navás's species to synonymy.

It is quite possible that *K. melagona* Klapálek, described from a single male specimen, is conspecific with material I am associating with *K. varipes*. The type of *K. melagona* has not been located so it has not been possible to compare it with the female type of *K. varipes*.

Since *K. varipes* resembles *K. klugii* (Pictet), the following description is offered to supplement the illustrations.

Length to wing tips, 13-17 mm in male (three specimens), 18-20 mm in female (two specimens). Length of forewing, 11, 13, and 14 mm in male, 15 and 16.5 mm in female.

Head dark without distinctive pattern, darkest between and anterior to ocelli, si-

des of head lighter, edge of clypeus lightest, small, lighter area medially behind rear ocelli. Antennae dark brown. Pronotum brown with small median yellow stripe in female, absent in male. Legs bicolored, more distinctive in male, basal third to 2/3 of femur of all legs yellow, greatest area on rear femora. Wings uniformly infuscated; number of median crossveins varies from 6 to 9. Cerci brown.

Female. — Subgenital plate strongly rounded with median small notch, extending about length of 8th sternite proper.

Male. — With typical modified 9th sternite bearing median, elongated keel bearing on its distal median third elongated, rectangular, bare hammer or knob. Aedeagus with distinctive sclerotized structure and a pair of small oval patches of densely spaced bristles.

This species is similar in appearance to *K. klugii* (Pictet) but is somewhat smaller. The dark central area of the head and the genitalia, particularly the sclerotized structure of the aedeagus, distinguish it. The female subgenital plate is more acutely rounded than in *K. klugii* and the knob or hammer longer and narrower.

Collection Data. — DISTRITO FEDERAL. Bom Retiro, 8-I-57, Santos, Machado, Barros, Myriam, male (SGJ). ESTADO DO RIO. Cachoeira de Muriqui, Ramal de Mangaratiba, I-56, J. Machado & N. Santos, female (SGJ); Petropolis, Alto Mosella, 1,100 m, III-54, D. Albuquerque, female (NM); Itatiaia, Retiro (no campo), XI-03, Carlos Moreira, male (NM). RIO DE JANEIRO. Jacarepaguá, H. Berla, male (NM).

ABSTRACT

Twenty species of Brazilian stoneflies are considered, nine in the family Gripopterygidae and eleven in the subfamily Acroneurinae. Genitalia and wings of most of these species are illustrated.

Tabulated data is given on the number of crossveins in the costal space beyond the subcosta for five Brazilian species of *Gripopteryx*. *Paragripopteryx* Enderlein is placed into the synonymy of *Gripopteryx* Pictet. *G. crassila* and *G. maculosa* are described as new. An allotype is described for *G. reticulata* Brauer. *G. neofriburgensis* Navás is placed into the synonymy of *G. tessellata* Brauer.

Author believes all described South American Perlidae belong to the subfamily Acroneurinae. *Anacroneuria furfurosa* is described as a new species. *Enderleina* is described as a new genus allied to *Kempnyia*; *E. preclara*, the type species of this new genus, is described. *Eutactophlebia* Klapálek is recognized as a valid genus; *E. gracilentata* (Enderlein) is partially re-described. Six species of *Kempnyia* Klapálek are differentiated. *Nedanta* Navás is placed as a synonym of *Kempnyia*. *K. tenebrosa* Klapálek, *N. fusca* Navás, *N. fulvata* Navás, and *Perla taunayi* Navás are placed into the synonymy of *K. klugii* (Pictet). *Nedanta isoscelia* Navás is regarded as a synonym of *K. varipes* Klapálek. A lectotype is designated for *K. flava* Klapálek, and an allotype male is described for this species.

Holotypes and allotypes are deposited as follows: *G. crassila*, in the collection of the California Academy of Sciences; *G. maculosa* and *A. furfurosa*, in the Museu Nacional do Brasil. The lectotype of *K. flava* is in the Naturhistorisches Museum, Vienna, and the male allotype of *E. preclara* is in the collection of the American Museum of Natural History. Paratypes of *G. maculosa* and *A. furfurosa* are deposited in the author's collection. — Author's abstract.

SUMÁRIO

São consideradas vinte espécies de plecoterios brasileiros, nove da família Cripoptery-

gidae e onze da subfamília Acroneurinae. A genitália e as asas da maioria destas espécies são ilustradas.

São apresentados dados tabulados sobre o número de nervuras transversais no espaço costal adiante da subcosta para cinco espécies brasileiras de *Gripopteryx*. *Paragripopteryx* Enderlein é colocado em sinonímia de *Gripopteryx* Pictet. *G. crassila* e *G. maculosa* são descritas como novas. É descrito um alótipo para *G. reticulata* Brauer. *G. neofriburgensis* Navás é colocada em sinonímia de *G. tessellata* Brauer.

O autor acredita que todos Perlidae sul-americanos descritos pertençam à subfamília Acroneurinae. *Anacroneuria furfurosa* é descrita como espécie nova. *Enderleina* é descrito como um gênero novo, afim de *Kempnyia*; *E. preclara*, a espécie-tipo deste gênero novo, é descrita. *Eutactophlebia* Klapálek é reconhecido como um gênero válido; *E. gracilentata* (Enderlein) é parcialmente re-descrita. *Nedanta* Navás é colocado em sinonímia de *Kempnyia*. *K. tenebrosa* Klapálek, *N. fusca* Navás, *N. fulvata* Navás e *Perla taunayi* Navás são colocadas na sinonímia de *K. klugii* (Pictet). *N. isoscelia* Navás é considerado como um sinônimo de *K. varipes* Klapálek. É designado um lectótipo para *K. flava* Klapálek e é descrito um alótipo macho para esta espécie.

Holótipos e alótipos estão depositados como segue: *G. crassila* na coleção da California Academy of Sciences; *G. maculosa* e *A. furfurosa* no Museu Nacional, Rio de Janeiro. O lectótipo de *K. flava* está no Naturhistorisches Museum, Viena e o alótipo macho no Museu Nacional, Rio de Janeiro. O holótipo de *E. preclara* está na coleção do American Museum of Natural History. Parátipos de *G. maculosa* e *A. furfurosa* estão depositados na coleção do autor.

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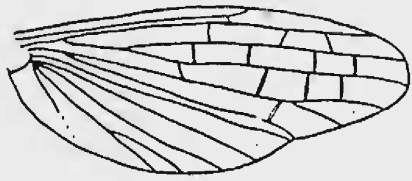
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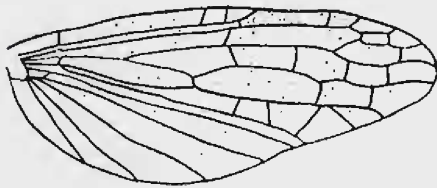
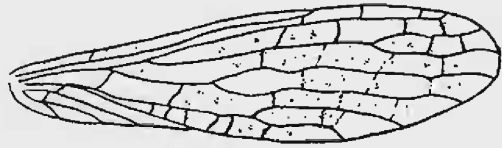
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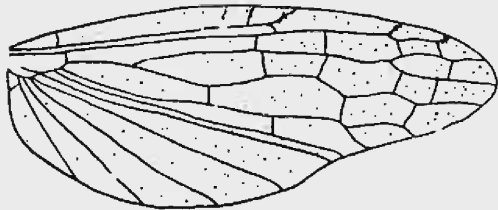
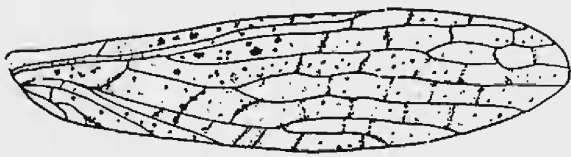
Figs. 1-4, 9 — 1. *Gripopteryx crassila*, right wing of holotype male; 1A, male genitalia, lateral view; 1B, female genitalia, ventral view. 2. *Gripopteryx maculosa*, right wing; 2A, holotype male genitalia, lateral view; 2B, ventral view; 2C, paratype female genitalia, ventral view. 3. *Gripopteryx reticulata*, right wing; 3A, male genitalia, lateral view; 3B, ventral view; 3C, female genitalia, ventral view. 4. *Gripopteryx tessellata*, left hind femur. 9. *Anacroneuria furfurosa*, head and pronotum; 9A, female genitalia, ventral view.



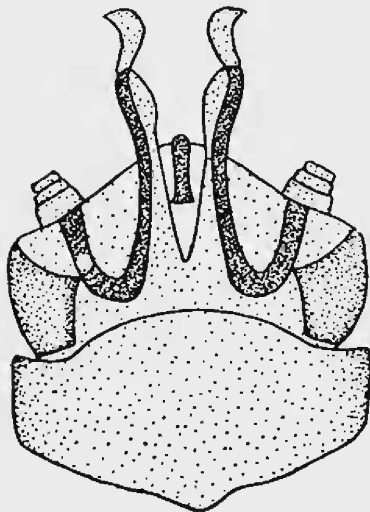
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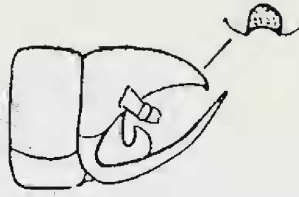
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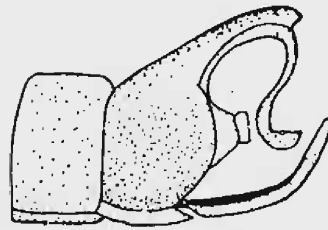
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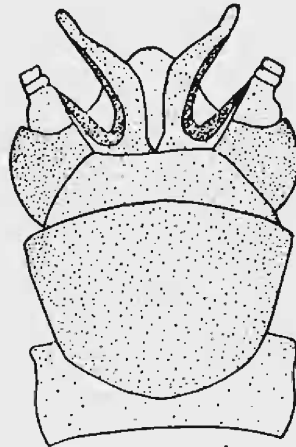
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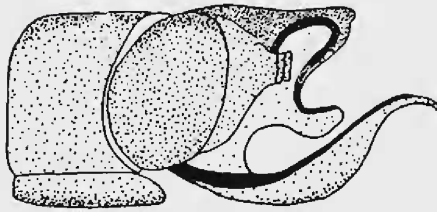
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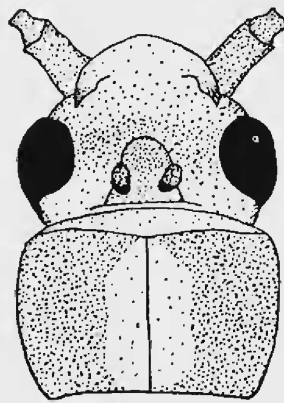
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2B



2c



9

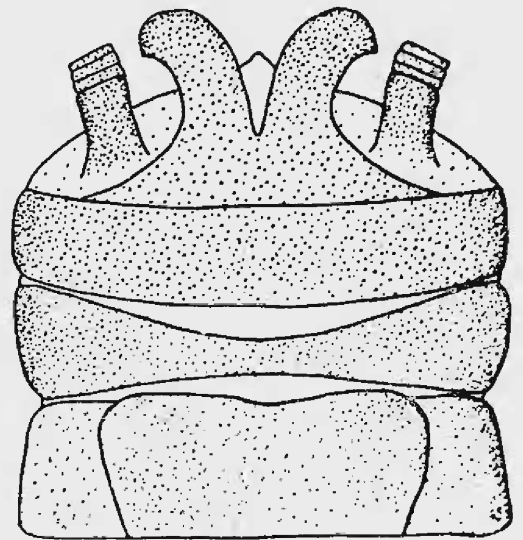


9A

3A

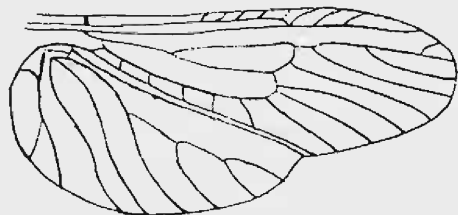
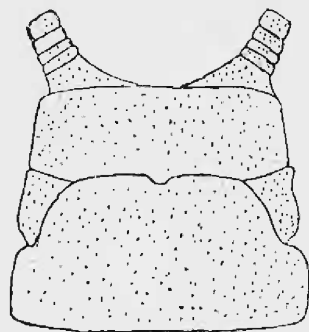
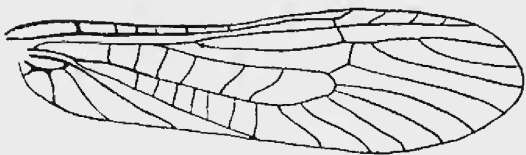
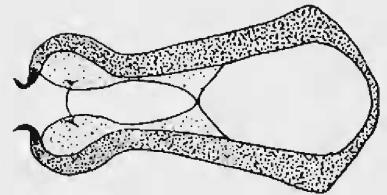
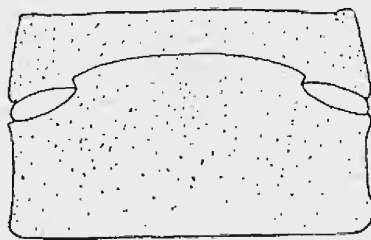
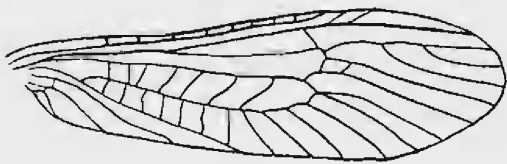
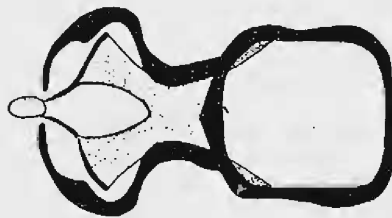
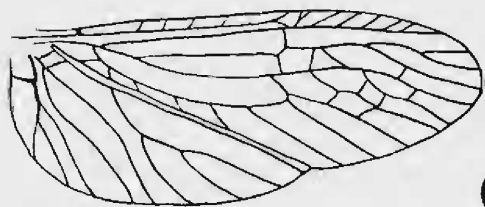
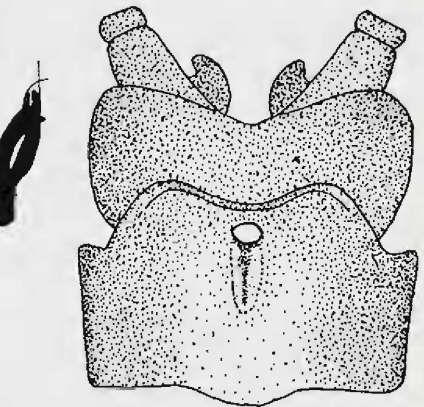
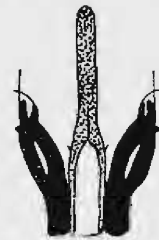
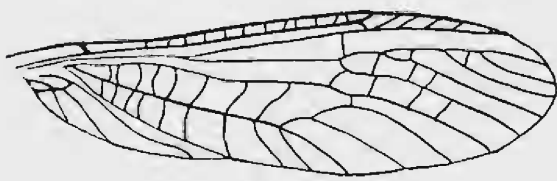
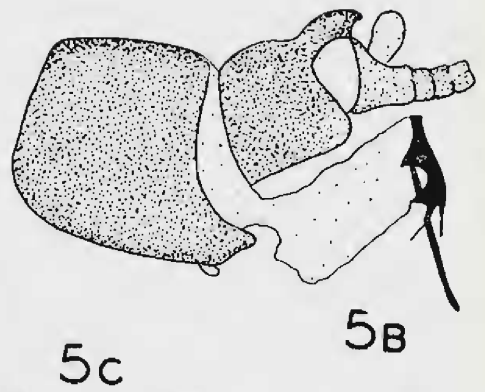
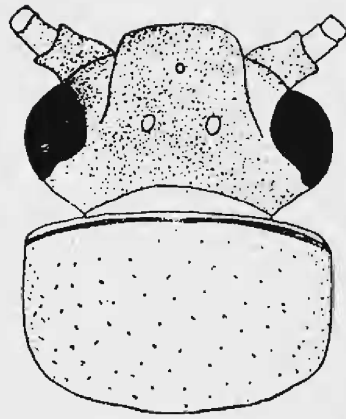
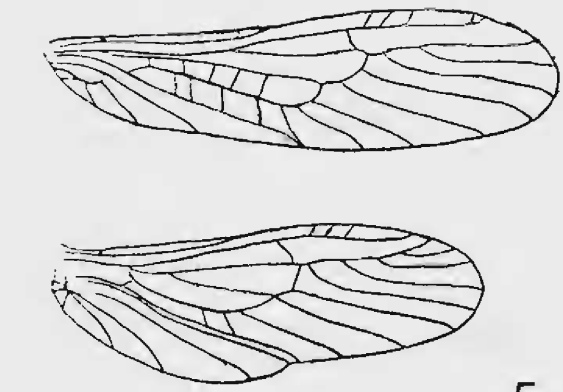


4



3c

Figs. 5-8 — 5. *Enderleina preclara*, right wing of holotype male; 5A, head and pronotum; 5B, male genitalia, ventral view; 5C, male aedeagal process dorsal view; 5D, male genitalia, ventral view. 6. *Eutactophlebia gracilenta*, right wing; 6A, male aedeagal process, lateral view; 6B, dorsal view; 6C, female genitalia, ventral view. 7. *Kempnyia flava*, right wing; 7A, male aedeagal process of allotype, lateral view; 7B, ventral view. 8. *Kempnyia varipes*, right wing; 8A, male aedeagal process, lateral view; 8B, ventral view; 8C, female genitalia, ventral view.



8

8c

8B